

What is claimed is:

1. A low dislocation buffer formed between a substrate and a nitride semiconductor as a device material to be formed for constituting a device structure on said substrate, comprising:

a first layer made of a nitride semiconductor containing an impurity at a concentration exceeding its doping level being laminated a predetermined number of times alternately with a second layer made of a nitride semiconductor containing no impurity on the substrate to form a superlattice structure.

2. A low dislocation buffer as claimed in claim 1 wherein:

a concentration of an impurity contained in a nitride semiconductor for forming said first layer is from 10^{18} cm^{-3} to 10%.

3. A low dislocation buffer as claimed in any one of claims 1 and 2 wherein:

said impurity is Si (silicon), C (carbon), Mg (magnesium), or O (oxygen).

4. A low dislocation buffer as claimed in any one of claims 1 and 2 wherein:

a nitride semiconductor for forming said first layer or said second layer is a three-five nitride semiconductor.

5. A low dislocation buffer as claimed in claim 3 wherein:

a nitride semiconductor for forming said first layer or said second layer is a three-five nitride semiconductor.

6. A low dislocation buffer as claimed in any one of claims 1 and 2 wherein:

said substrate is made from Si (silicon), SiC (silicon carbide), Al_2O_3 (sapphire), or GaAs (gallium arsenide).

7. A low dislocation buffer as claimed in claim 3 wherein:
said substrate is made from Si (silicon), SiC (silicon
carbide), Al₂O₃ (sapphire), or GaAs (gallium arsenide).

8. A low dislocation buffer as claimed in claim 4 wherein:
said substrate is made from Si (silicon), SiC (silicon
carbide), Al₂O₃ (sapphire), or GaAs (gallium arsenide).

9. A low dislocation buffer as claimed in claim 5 wherein:
said substrate is made from Si (silicon), SiC (silicon
carbide), Al₂O₃ (sapphire), or GaAs (gallium arsenide).

10. A process for the production of a low dislocation buffer
formed between a substrate and a nitride semiconductor as a device
material to be formed for constituting a device structure on said
substrate, comprising:

a first step for forming either of a first layer made of
a nitride semiconductor containing an impurity at a concentration
exceeding a doping level or a second layer made of a nitride
semiconductor containing no impurity;

a second step for forming either layer of said first layer
and said second layer, which has not yet been formed by said first
step on the layer, which has been formed by said first step; and

said first step and said second step being alternately
repeated a predetermined number of times to laminate said first
layer alternately with said second layer on the substrate at the
predetermined number of times to form a superlattice structure.

11. A process for the production of a low dislocation buffer
as claimed in claim 10 wherein:

a concentration of an impurity contained in a nitride
semiconductor for forming said first layer is substantially 1%

or more.

12. A process for the production of a low dislocation buffer as claimed in any one of claims 10 and 11 wherein:

said impurity is Si (silicon), C (carbon), Mg (magnesium), or O (oxygen).

13. A process for the production of a low dislocation buffer as claimed in any one of claims 10 and 11 wherein:

a nitride semiconductor for forming said first layer or said second layer is a three-five nitride semiconductor.

14. A process for the production of a low dislocation buffer as claimed in claim 12 wherein:

a nitride semiconductor for forming said first layer or said second layer is a three-five nitride semiconductor.

15. A process for the production of a low dislocation buffer as claimed in any one of claims 10 and 11 wherein:

said substrate is made from Si (silicon), SiC (silicon carbide), Al_2O_3 (sapphire), or GaAs (gallium arsenide).

16. A process for the production of a low dislocation buffer as claimed in claim 12 wherein:

said substrate is made from Si (silicon), SiC (silicon carbide), Al_2O_3 (sapphire), or GaAs (gallium arsenide).

17. A process for the production of a low dislocation buffer as claimed in claim 13 wherein:

said substrate is made from Si (silicon), SiC (silicon carbide), Al_2O_3 (sapphire), or GaAs (gallium arsenide).

18. A process for the production of a low dislocation buffer as claimed in claim 14 wherein:

said substrate is made from Si (silicon), SiC (silicon

carbide), Al_2O_3 (sapphire), or GaAs (gallium arsenide).

19. A device provided with a low dislocation buffer, comprising:

said low dislocation buffer being prepared by forming a predetermined device structure on the low dislocation buffer as claimed in any one of claims 1 and 2 with the use of a nitride semiconductor as a device material.

20. A device provided with a low dislocation buffer, comprising:

said low dislocation buffer being prepared by forming a predetermined device structure on the low dislocation buffer as claimed in claim 3 with the use of a nitride semiconductor as a device material.

21. A device provided with a low dislocation buffer, comprising:

said low dislocation buffer being prepared by forming a predetermined device structure on the low dislocation buffer as claimed in claim 4 with the use of a nitride semiconductor as a device material.

22. A device provided with a low dislocation buffer, comprising:

said low dislocation buffer being prepared by forming a predetermined device structure on the low dislocation buffer as claimed in claim 5 with the use of a nitride semiconductor as a device material.

23. A device provided with a low dislocation buffer as claimed in claim 19 wherein:

a nitride semiconductor that comes to be a device material

for constituting said device structure is a three-five nitride semiconductor.

24. A device provided with a low dislocation buffer as claimed in claim 20 wherein:

a nitride semiconductor that comes to be a device material for constituting said device structure is a three-five nitride semiconductor.

25. A device provided with a low dislocation buffer as claimed in claim 21 wherein:

a nitride semiconductor that comes to be a device material for constituting said device structure is a three-five nitride semiconductor.

26. A device provided with a low dislocation buffer as claimed in claim 22 wherein:

a nitride semiconductor that comes to be a device material for constituting said device structure is a three-five nitride semiconductor.